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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/519,679	08/18/2005	Vladimir Cagan	264230US2PCT	9267
22850	7590	11/12/2008		
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER CASAREGOLA, LOUIS J	
			ART UNIT	PAPER NUMBER
			3741	
			NOTIFICATION DATE	DELIVERY MODE
			11/12/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/519,679	Applicant(s) CAGAN ET AL.	
	Examiner Louis J. Casaregola	Art Unit 3741	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 7/29/08.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-22 is/are pending in the application.
- 4a) Of the above claim(s) 12-15, 17, 21-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11, 16, 18-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Election

Applicants' election of the species of Figure 3 is acknowledged. Applicants have listed claims 11 and 13-20 as readable on that species, but claims 13, 14, 15 and 17 do not in fact read on the Figure 3 embodiment. Claim 13 requires that each of the recited magnetic circuit arms comprise a permanent magnet, whereas, the species of Figure 3 includes no permanent magnet on its central arm 41. Claim 14 depends from non-elected claim 12, and claim 17 depends from claim 14, hence, both of claims 14 and 17 include the same non-elected subject matter as claim 12. Claim 15 depends from claim 13 and likewise includes the same non-elected subject matter as claim 13. Claims 13, 14, 15 and 17 are consequently withdrawn from consideration along with non-elected claims 12, 21 and 22. An action on the merits of remaining claims 11, 16 and 18-20 is presented below.

Claim Rejections - 35 USC 103

Claims 11, 16 and 18-20 are rejected under 35 USC 103(a) as being unpatentable over either Arkhipov et al (US 5,359,258) or Valentian et al (US 6,281,622) in view of either Egorov et al (US 5,218,271) or Yashnov et al (US 5,847,493), all of which were cited in the previous office action. Arkhipov and Valentian disclose plasma thrusters having most of the features of the claimed thruster, and applicants acknowledge that

these prior art thrusters are essentially similar to the thruster shown in applicants' own Figures 1 and 2 (see specification, page 1).

Attention is now called to the thruster shown in Arkhipov's Figures 1-3. This thruster has an axis shown at the bottom of the figure, an upstream portion shown at the right of the figure, and a downstream portion shown at the left of the figure. (The upstream and downstream directions correspond to the claimed directions now defined and clarified by applicants' latest amendment.) Arkhipov's Figures 1-3 further show acceleration channel 3 made of refractory material (col. 3, lines 21-23), cylindrical poles 3a and 3b, annular gas dispensing anode 1, cathode 2', and a magnetic circuit comprising a downstream plate (unnumbered) along with central arm 7 and peripheral arms 6 all of which include polar end sections. (Valentian's Figures 1 and 2 show a similar thruster, but it will not be discussed in detail since it has the same basic features as Arkhipov's thruster.)

The only significant difference between the thrusters disclosed by the primary references and the present invention is that the central and peripheral arms of the Arkhipov and Valentian thrusters use magnetic coils, whereas, the claimed invention requires that at least one of the arms employ a permanent magnet. It is however well known in the plasma thruster field that permanent magnets may be substituted for magnetic coils. See for example, the coils on poles 5 and 6 in Egorov's Figure 1 along with the comment in column 6, lines 31-32, and see also the coils at 16 and 17 in Yashnov's Figures 3 and 4 along with the comment in column 6, lines 32-35. In view of this clear

suggestion by the secondary references, it would have been obvious to substitute permanent magnets for the magnetic coils on any or all of the pole arms in the thruster disclosed by either of the primary references.

Final Rejection

Applicants' amendment necessitated the new grounds of rejection. Accordingly, ***THIS ACTION IS MADE FINAL.*** See MPEP 706.07(a). Applicants are reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A SHORTENED STATUTORY PERIOD FOR RESPONSE TO THIS FINAL ACTION IS SET TO EXPIRE THREE MONTHS FROM THE DATE OF THIS ACTION. IN THE EVENT A FIRST RESPONSE IS FILED WITHIN TWO MONTHS OF THE MAILING DATE OF THIS FINAL ACTION AND THE ADVISORY ACTION IS NOT MAILED UNTIL AFTER THE END OF THE THREE-MONTH SHORTENED STATUTORY PERIOD, THEN THE SHORTENED STATUTORY PERIOD WILL EXPIRE ON THE DATE THE ADVISORY ACTION IS MAILED, AND ANY EXTENSION FEE PURSUANT TO 37 CFR 1.136(a) WILL BE CALCULATED FROM THE MAILING DATE OF THE ADVISORY ACTION. IN NO EVENT WILL THE STATUTORY PERIOD FOR RESPONSE EXPIRE LATER THAN SIX MONTHS FROM THE DATE OF THIS FINAL ACTION.

/Louis J. Casaregola/
Primary Examiner; A.U. 3741
571-272-4826 (M-F; 7:30-4:00)
571-273-8300 FAX
November 6, 2008

Art Unit: 3741

If repeated attempts to reach the examiner by telephone are unsuccessful, the art unit supervisor, Michael Cuff, can be reached at 571-272-6778.

Information regarding the status of this application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR, and status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).